ACC.15
TCT@ACC-i2 | innovation in intervention

A1165
JACC March 17, 2015
Volume 65, Issue 10S

Non Invasive Imaging (Echocardiography, Nuclear, PET, MR and CT)

CLINICALLY EQUIVALENT CORONARY ARTERY CALCIFICATION SCORING AT 70% LOWER DOSE RADIATION WITH ITERATIVE RECONSTRUCTION VERSUS STANDARD DOSE RADIATION

Poster Contributions
Poster Hall B1
Saturday, March 14, 2015, 3:45 p.m.-4:30 p.m.

Session Title: Non Invasive Imaging: CT/Multimodality, Angiography, and Non-CT Angiography
Abstract Category: 16. Non Invasive Imaging: CT/Multimodality, Angiography, and Non-CT Angiography
Presentation Number: 1136-030

Authors: *Andrew Choi, Sujata Shanbhag, Kathie Bronson, Shahryar Saba, Gina LaRocca, Andrew Ertel, Anu Rao, Jeannie Yu, Kalindi Parikh, Eric Leifer, Andrew Arai, Marcus Chen, National Heart, Lung and Blood Institute, National Institutes of Health, Bethesda, MD, USA, Division of Cardiology, Medstar Washington Hospital Center, Washington, DC, USA*

Background: Coronary artery calcification (CAC) quantification is important for cardiovascular risk assessment, but exposes patients (pts) to radiation. Iterative reconstruction (IR) reduces image noise and enables lower radiation, but has not been prospectively validated against conventional filtered back projection (FBP). This study tests whether IR with 70% radiation dose reduction results in similar image quality and clinical equivalence as standard (std) dose FBP.

Methods: 151 consecutive pts (58% male, 61±9 yrs, 28±7 BMI) prospectively underwent 2 IR low and 2 FBP std dose scans (604 total scans) in randomized order. CAC was quantified using Agatston method and compared using linear regression, Bland-Altman and weighted kappa for standard clinical Agatston risk groups (0, 1-10, 11-100, 101-400, >400).

Results: Radiation exposure was 70% lower for low vs. std dose (0.45 vs 1.50 mSv, p<0.0001), yet image quality by signal to noise ratio was similar [49±18 HU vs 49±16 HU, p=NS]. Low IR compared to std FBP showed no significant difference in Agatston score [mean 245 vs 260 (range 0-2565), mean difference 22 ± 36, p=NS] and excellent correlation (figure, R^2=0.99). Clinical equivalence of low IR vs std FBP was similar to 2 std FBP scans with 95% (143/151 subjects) classified in the same Agatston group and a 0.97 weighted (95% CI 0.95 - 0.99).

Conclusion: Low dose IR, when compared to standard FBP, achieves 70% radiation dose reduction with similar image quality and near-clinically equivalent CAC scoring.

Figure: (A) Linear Regression Analysis of Low Dose IR vs. Standard Dose FBP (B) Bland-Altman Plot of Low IR and Standard FBP